

"SOLAR WATER HEATER"

The present invention relates to solar water heaters.

In solar water heaters comprising a water storage tank, it is essential that heat losses be minimised. It
5 has been found that foamed polyurethane insulation provides a good material for this purpose.

With a horizontal storage vessel in a domestic solar water heater, when hot water is drawn from the tank, cold water enters the bottom of the tank and lies along
10 the bottom in a stratified manner below the hot water contents of the tank. Under normal conditions of use, following a day of exposure to solar radiation, the tank is full of hot water. Evening water useage causes about one third of the tank volume to be drawn off and
15 this quantity of hot water is replaced by cold water lying along the bottom of the tank. Heat loss is proportional to the temperature difference between two surfaces and so the heat loss from the upper two thirds of the container is much greater than that from
20 the lower one third where insulation of equal thickness is used for all parts of the tank.

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Also, under conditions of non-use, in a thermosyphon type solar water heater, where the tank is left to stagnate, the water reaches its highest equilibrium temperature. Under these circumstances, the tank may
5 still be full of hot water at the end of the night or non-solar period. High stagnation temperatures lead to accelerated breakdown of container materials, fouling of collector ways, tripping of auxiliary heater safety cut outs and temperature-operated relief valves.

10 An object of the present invention is to provide a solar water heater in which the above disadvantages are overcome or mitigated.

In accordance with the present invention there is provided a thermosyphon type water heater comprising
15 a substantially horizontally disposed cylindrical water storage tank which tank is entirely surrounded by an insulating layer of foamed plastics material, the part of said layer surrounding the upper region of said tank being thicker than the part of said layer surrounding
20 the lower region of said tank, thereby preventing excessive heat loss from the upper region of said tank normally containing hot water, while permitting heat to be lost from said lower region of said tank under

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stagnation conditions, said layer having a topmost thickness in the range from 40 to 80 mm and a lowermost thickness in the range from 5 to 15 mm.

The use of an insulating layer of varying thickness enables good insulation to be obtained under night time conditions for the region of the tank usually containing hot water. On the other hand, thinner insulation in the lower region of the tank enables heat to be lost from the tank under stagnation conditions so reducing the equilibrium temperature of the tank.

The present invention will now be described, by way of example, with reference to the accompanying drawing, which is a schematic transverse section through a cylindrical water storage tank of a thermosyphon type solar water heater in accordance with the present invention.

As is shown in the drawing, a cylindrical water storage tank 10 for a solar water heater is surrounded by a layer 12 of foamed polyurethane insulating material. The layer 12 is of varying thickness and the thickness generally varies in proportion to the temperature difference between the stored water temperature and the surrounding ambient temperature. The topmost insulation

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indicated at 14 has thickness in the range from 40 to 80 mm, preferably 50 to 70 mm, such as 65 mm.

The lowermost insulation indicated at 16 has a thickness in the range from 5 to 15 mm, such as 10 mm. The use

5 of a cylindrical storage tank assymetrically located within an insulating case as described herein has been found to provide effective insulation against heat losses whilst overcoming the problem of excessive stagnation temperature.

10 Modifications and variations may be made without departing from the scope of the claims.

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CLAIMS.

1. A thermosyphon type solar water heater comprising
a substantially horizontally disposed cylindrical water
storage tank which tank is entirely surrounded by an
insulating layer of foamed plastics material, the part
of said layer surrounding the upper region of said tank
being thicker than the part of said layer surrounding the
lower region of said tank, thereby preventing excessive
heat loss from the upper region of said tank normally
containing hot water, while permitting heat to be lost
from said lower region of said tank under stagnation
conditions, said layer having a topmost thickness in the
range from 40 to 80 mm and a lowermost thickness in
the range from 5 to 15 mm.

2. A thermosyphon type solar water heater according
to claim 1, wherein the topmost thickness of the layer of
foamed plastics material is in the range from 50 to 70 mm.

3. A thermosyphon type solar water heater according
to claim 1 or 2, wherein the foamed plastics material is
foamed polyurethane.

4. A thermosyphon type solar water heater comprising
a water storage tank constructed and arranged substantially
as herein described with reference to and as illustrated
in the accompanying drawing.